


Name:			
Enrolment No:			
UPES End Semester Examination, May 2024 Course: Environmental & Agricultural Microbiology Semester: II Program: MSc Microbiology Duration: 3 Hours Course Code: HSMB7031 Max. Marks: 100 Instructions: All questions are compulsory.			
S. No.	Section A Short answer questions/ MCQ/T&F (20Qx1.5M= 30 Marks)	Marks	Cos
Q1	State the difference between BOD and COD.	1.5	CO2
Q2	The association which involves the exchange of nutrients between two species is referred to as: A. Mutualism B. Syntrophism C. Commensalism D. Antagonism	1.5	CO1
Q3	Define Biopesticides.	1.5	CO3
Q4	Bioaugmentation involves: A. Eliminating sludge B. Plants usage for bioremediation C. Addition of microbes to a cleanup site D. Bioventing	1.5	CO3
Q5	The following is an example of PGPR: A. <i>Erwinia amylovora</i> B. <i>Xanthomonas campestris</i> C. <i>Ralstonia solanacearum</i> D. <i>Azotobacter vinelandii</i>	1.5	CO2
Q6	Bt toxin is: A. Intracellular lipids B. Intracellular crystalline protein C. Extracellular crystalline protein D. Intracellular polysaccharide	1.5	CO3

Q7	Golden rice is a GM crop plant where the incorporated gene is meant for biosynthesis of: A. Vitamin B B. Vitamin C C. Omega 3 D. Vitamin A	1.5	CO3
Q8	Identify the zone which have considerable rooted vegetation: a) Littoral zone b) Limnetic zone c) Profundal zone d) Benthic zone	1.5	CO1
Q9	State how the sulfur pearl of Namibia, <i>Thiomargarita namibiensis</i> , may acquire dissolved nutrients despite their low surface-area to volume ratios?	1.5	CO2
Q10	Define Thermocline and Pycnocline.	1.5	CO2
Q11	Pedogenesis is the process of: A. Soil formation B. Rock formation C. Petroleum formation D. Hydrocarbon formation	1.5	CO1
Q12	The following is an example of dissimilatory Fe reducing bacteria: A. <i>Shewanella algae</i> B. <i>Bacillus cereus</i> C. <i>E coli</i> D. <i>Rhodomicrobium</i>	1.5	CO2
Q13	Mention an example of phototrophic bacteria that form endospores.	1.5	CO2
Q14	Comment if pests can develop resistance to the toxins produced by Bt cotton?	1.5	CO3
Q15	Comment on the difference between zone of eluviation and illuviation.	1.5	CO1
Q16	Define photoheterotrophs. Give an example of photoheterotroph.	1.5	CO2
Q17	Interspecies hydrogen transfer between <i>Methanospirillum</i> and <i>Syntrophobacter</i> is an example of A. Competition B. Syntrophism C. Oxidation D. Hydrogenation	1.5	CO2

Q18	The Redfield ratio is an index of concentration of: a) Carbon, Hydrogen and Oxygen b) Nitrogen, Potassium and Iron c) Carbon, Nitrogen and Phosphorous d) Carbon, Phosphorous and Sulfur	1.5	CO1
Q19	Bacteria release chemicals to signal each other by _____ : a) Quorum sensing b) Antagonism c) Conjugation d) Transformation	1.5	CO2
Q20	State the difference between neuston, plankton and benthos.	1.5	CO1
Section B (4Qx5M=20 Marks)			
Q1	Explain the difference between Oxygenic and Anoxygenic photosynthesis with a labelled diagram.	5	CO2
Q2	Define PGPM bacteria. State their importance for plant growth and productivity.	5 (1+4)	CO3
Q3	Describe briefly the symbiotic microbial interactions of hydrothermal vent ecosystems with a labelled diagram.	5	CO2
Q4	Enlist and describe key environmental samplers and profilers for study of various aquatic and sediment samples.	5	CO1
Section C (2Qx15M=30 Marks)			
Q1	Explain and discuss the predominant terminal electron accepting processes involved during microbial degradation of organic matter, with a labelled diagram and examples of representative genera.	15	CO3
Q2	a) Define mycorrhizae. b) Enlist different types of mycorrhizae. c) Explain the differences between Arbuscular Mycorrhizae and Ectomycorrhiza with a schematic diagram. d) State the importance of mycorrhizae for plant productivity and soil health.	15 (2+4+4+5)	CO2
Section D (2Qx10M=20 Marks)			
Q1	(a) Describe in detail the processes of Annamox and Denitrification. (b) Discuss their contrasting roles in global Nitrogen Cycling.	10 (5+5)	CO3
Q2	Explain the different zonations of the Ocean with a neat-labelled diagram.	10	CO1